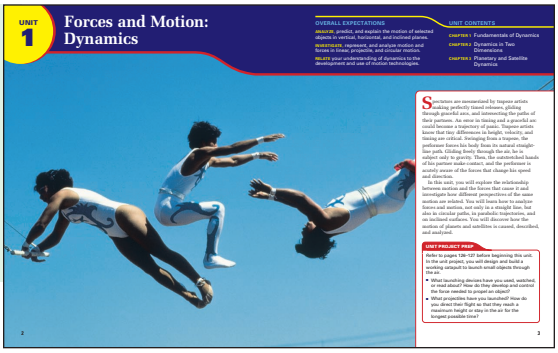
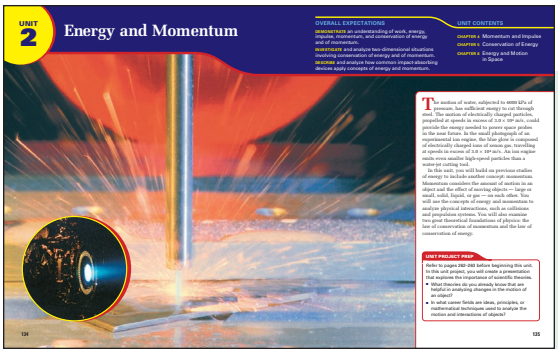
INTRODUCING

Physics 12

Physics 12 synthesizes and builds on the knowledge and skills that you have acquired in previous courses, establishing a base for further studies in science, engineering, and many related fields. Here is a glimpse of how *Physics 12* will guide you as you experience the ever-expanding field of physics.

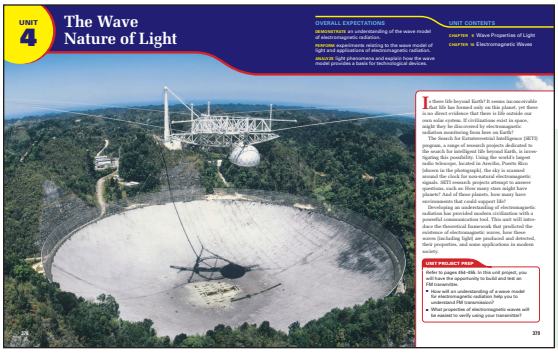
In Unit 1, Forces and Motion: Dynamics, you will examine dynamics as a way of explaining and predicting the motion of objects by analyzing the forces that act on them. How is it possible to predetermine the release point of emergency food supplies dropped from a plane so that they will land in an accessible spot? What forces prevent a vehicle from sliding off the road when it turns a corner? Answers to these questions depend on a knowledge of dynamics.



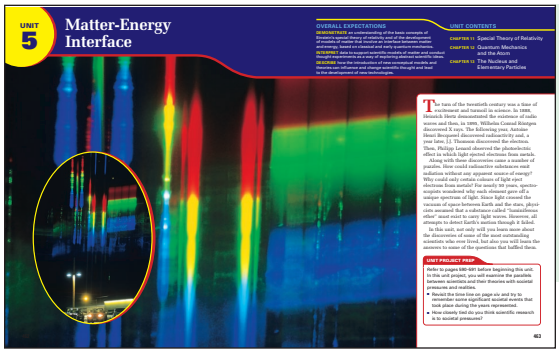


Formula One drivers sometimes walk away from dramatic collisions that destroy their vehicles; this happens as a result of improved automotive safety features that are based on a knowledge of momentum and the transformation of energy. In Unit 2, by examining momentum, you will learn how accident investigators analyze car crashes and how the controlled transfer of thermal energy (heat) powers everything from motorcycles to rockets.

You use products and have many experiences based on the concepts presented in Unit 3, Electric, Gravitational, and Magnetic Fields — your television projects a clear, colourful picture; an amusement park ride safely slows your descent without any effort on your part; electric motors run many appliances and tools that you use.

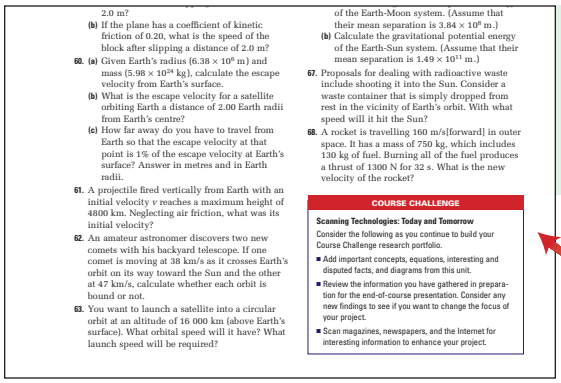


Unit 4 provides an in-depth study of the wave nature of light. You will investigate how light, one form of electromagnetic radiation, behaves like a wave. Electromagnetic radiation transports the Sun's energy to Earth, enables cellphone conversations, and beams pictures of an event on the other side of the world into your home.

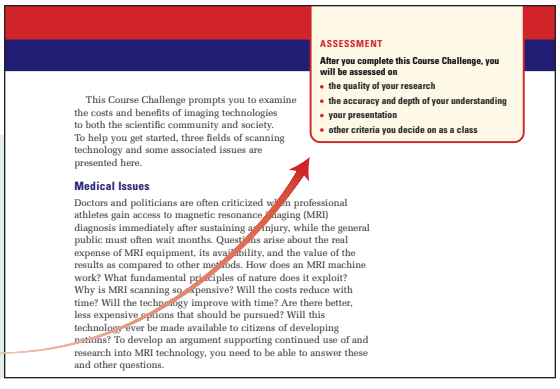


In Unit 5, Matter-Energy Interface, you will explore the challenges of modern physics based on the work of scientists such as Albert Einstein and Niels Bohr. Does time really slow down when an object travels close to the speed of light? What causes some atoms to experience nuclear decay? Can light be modelled as a particle? What is a quark? The answers to these questions are explored in Unit 5.

Following Unit 5, you will find the Physics Course Challenge, Scanning Technologies — Today and Tomorrow. You will apply your skills of inquiry, communication, and analysis to make connections among science, technology, society, and the environment. Your participation in the Course Challenge project will provide you with new insight into an ever-advancing, sometimes controversial technology.



Watch for Course Challenge cues in the margins as you progress through the textbook. These cues will help you to plan in advance for the Course Challenge, by triggering your thought processes on the subject, pointing out relevant avenues of research, and identifying specific course topics.



You will probably be designing rubrics that your class will use to assess your Course Challenge, so remember to include criteria that will address all of the achievement categories: Knowledge/Understanding, Inquiry, Communication, and Making Connections. As you work on the Challenge, remember to refer to the rubric that will be used to assess your presentation.